Note: Performing your original search, ***aw glass***, in PubMed will retrieve *55* citations.

1: J Biomed Mater Res. 2000 Jul;51(1):37-46.

Quantitative comparison of bone growth behavior in granules of Bioglass, A-W glass-ceramic, and hydroxyapatite.

Oonishi H, Hench LL, Wilson J, Sugihara F, Tsuji E, Matsuura M, Kin S, Yamamoto T, Mizokawa S.

Department of Orthopedic Surgery, Artificial Joint Section and Biomaterial Laboratory, Osaka-Minami National Hospital. 2-1, Kidohigashi-machi, Kawachinagano-City, Osaka, 586-8521, Japan.

The hypothesis that bioactive glass particulate increases the rate of bone proliferation over that of synthetic hydroxyapatite and bioactive glass-ceramic was tested in these experiments. Three types of bioactive particles-45S5 Bioglass(R), synthetic hydroxyapatite, and A-W glass-ceramic-were implanted in 6-mm-diameter holes drilled in the femoral condyles of mature rabbits. Bone growth rate was measured using an image processor. 45S5 Bioglass(R) produced bone more rapidly than either A-W glass-ceramic or hydroxyapatite. At the later time periods, 45S5 Bioglass(R) was resorbed more quickly than A-W glass-ceramic. Synthetic hydroxyapatite was not resorbed at all. Backscattered electron imaging suggested that the resorption process occurred by solution-mediated dissolution, which produced chemical changes in the enclosed particulate. It was concluded that the rate of bone growth correlates with the rate of dissolution of silica as the particles resorb. Copyright 2000 John Wiley & Sons, Inc.

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Related Links

Comparative bone growth behavior in granules of bioceramic materials of various sizes. [J Biomed Mater Res. 1999]

[Effect of fibrin on osseointegration of bioactive glass-ceramic materials--experimental study] [Kaibogaku Zasshi. Journal of Anatomical Society of Japan. 2001]

Mechanical properties of bone after implantation of apatite-wollastonite containing glass ceramic-fibrin mixture. [J Biomed Mater Res. 1990]

Transmission electron microscopic study of interface between bioactive bone cement and bone: comparison of apatite and wollastonite containing glass-ceramic filler with hydroxyapatite and beta-tricalcium phosphate filler. [J Biomed Mater Res. 1999]

Quantitative study on osteoconduction of apatite-wollastonite containing glass ceramic granules, hydroxyapatite granules, and alumina granules. [Biomaterials. 1990]

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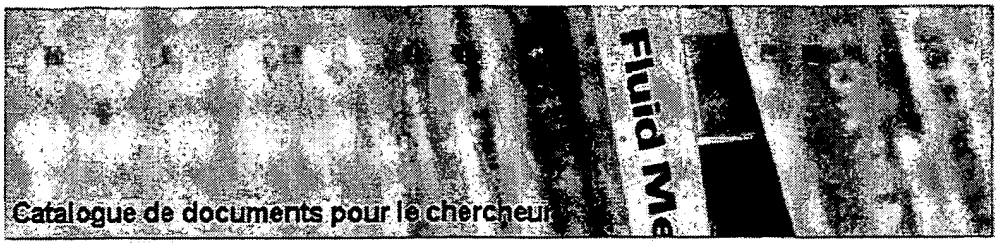

Titre du document / Document title
A-W glass ceramic as a bone substitute in cemented hip arthroplasty : 15 hips followed 2-10 years

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Résumé / Abstract
We retrospectively reviewed hip arthroplasties in 13 patients (15 hips), in whom we had used apatite-wollastonite (A-W) glass ceramic together with auto- or allograft for augmentation of severe bone deficiency. 11 cemented sockets and 4 stem revisions were included and followed for 2-9.6 years. There were no radiolucent lines between A-W glass ceramic and surrounding bone, and remodeling of the bone graft containing A-W glass ceramic was observed. No migration of cemented sockets was seen except in 1 case, which was revised. In this case, direct bonding between bone and A-W glass ceramic granules was present histologically. In 4 stem revisions, 5 mm subsidence occurred in 1 case. However, the stem became stable and remodeling of the grafted bone occurred. An artificial bone material, such as A-W glass ceramic, can be used under high-load conditions, because of its good mechanical properties.

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1: Nippon Seikeigeka Gakkai Zasshi. 1994 Jul;68(7):505-15.

Links

[Clinical application of AW glass ceramic prosthesis in spinal surgery]

[Article in Japanese]

Yamamuro T, Shimizu K.

Department of Orthopaedic Surgery, Faculty of Medicine, Kyoto University.

Bone prosthesis of apatite- and wollastonite-containing glass-ceramic (AW-GC), a new synthesized material, is known to be excellent in bonding directly with adjacent living bone tissue, in having strong mechanical strength and no toxic effects, in experimental studies. In spinal surgery, massive and strong bone grafts are required for reconstruction of the spinal column affected by a tumor, trauma, or a degenerative disease. However, utilization of bone allograft is not yet socially accepted in Japan and also there are other barriers against the supply of allograft bone. In the present study, AW-GC bone prosthesis was used for reconstructive surgery for various spinal diseases and follow-up studies were performed for an average of 14.9 months (range: 2-36 mo). The clinical results were satisfactory. Thirty patients (males: 17 and females: 13) with an age range of 40-75 years (mean: 55.3 years) were reviewed in this study. Preoperative diagnoses for which an AW-GC prosthesis was required were as follows; vertebral prosthesis: 15 with metastatic tumor of the spine, 3 with burst fracture of the thoraco-lumbar spine; vertebral spacer: 6 with degenerative spondylolisthesis, 2 with isthmic spondylolisthesis, 2 with lumbar intervertebral disc herniation, and one with spinal canal stenosis. Patient's satisfaction, roentgenographic evaluation, laboratory data on blood and urine, and toxic effects were examined in these patients. As a result, the patient's satisfaction for the AW-GC bone prosthesis was high, and the initial fixation and long term stability were excellent. For kyphotic deformity and scoliosis, postoperative correction could be maintained in two patients where correction was attempted, and the usefulness of AW-GC prosthesis as a spinal prosthesis was confirmed. Good bone formation around the prosthesis was observed with time. The clear zone (radiolucent line between ceramic and bone) tended to decrease or disappear. There were no systemic or local toxic side-effects considered to be due to the AW-GC bone prosthesis, or no abnormalities in the laboratory data. These findings suggested that the AW-GC bone prosthesis is a new biomaterial with excellent properties which can be successfully substituted for bone graft in reconstructive spinal surgery.

PMID: 8071576 [PubMed - indexed for MEDLINE]

Related Links

Rigid, semirigid versus dynamic instrumentation for degenerative lumbar spinal stenosis: a correlative radiological and clinical analysis of short-term results. [Spine. 2004]

[Use of bioceramics in the treatment of fractures of the thoraco-lumbar spine] [Acta Chir Orthop Traumatol Cech. 2002]

Spinal canal enlargement procedure by restorative laminoplasty for the treatment of lumbar canal stenosis. [Spine. 2003]

Vertebral body replacement with a ceramic prosthesis for metastatic spinal tumors. [Spine. 1995]

Posterior lumbar interbody fusion for degenerative spondylolisthesis: restoration of sagittal balance using insert-and-rotate interbody spacers. [Spine. 2005]

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Original Article

A bioactive bone cement containing Bis-GMA resin and A–W glass-ceramic as an augmentation graft material on mandibular bone

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Abstract

Abstract:
The potential of a bioactive bone cement (BABC) as an onlay graft material for the mandible with and without the periosteum was investigated in rabbits. Its matrix consists of bisphenol-α-glycidyl methacrylate (Bis-GMA) and triethylene-glycol dimetacrylate (TEGDMA) and its filler is silane-treated $CaO–SiO_2–P_2O_5–MgO–CaF_2$ glass (A–W glass-ceramic) powder. The BABC was pasted onto the mandible under the periosteum in Group 1, and onto the mandible with the periosteum removed in Group 2 and allowed to set *in situ*. In both groups, the cement–bone interface was filled by new bone at 4, 12 and 48 weeks, and bone grew from adjacent bone tissue into the cement–soft tissue interface at 12 and 48 weeks. There were no differences in the rate of bone formation between the groups. The shearing strength increased progressively from 0.25±0.10 MPa (mean±SD) at week 1 to 7.98±0.62 MPa at week 48. The results suggest that the BABC has good handling properties, a high bonding strength and good biocompatibility, and that it has potential for clinical application as a substitute material for autogenous bone transplantation.

Percentage solution

From Wikipedia, the free encyclopedia

In biology **percentage solutions** are often preferred to molar ones. A 1% solution would have 1 g of solute dissolved in a final volume of 100 ml of solvent. This would be labeled as a weight/volume [w/v] percentage solution. For w/w, both solvent and solute would need to be weighed in the required ratios. Volume would accordingly be measured using a measuring cylinder, volumetric flask, pipette or similar. Labels should show what the percentage relationships are (w/v, w/w or v/v).

The molarity of a percentage solution (w/v) can be calculated using the molar mass of the solute used. For example, sucrose (table sugar) has a molar mass of a 342.34 g/mol. A 1% sucrose solution (w/v), therefore, is 0.029 molar, or 29 mM.

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